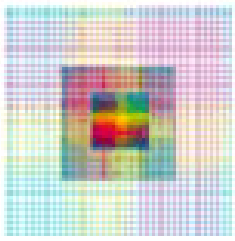

AUDIT II

Country Report
FRANCE

Hubert Despretz
Final Report 05.06.2002

FRANCE

SUMMARY OF ENERGY AUDITING

Since the first oil crisis in 1973, France has endeavoured to increase its energy independence through the exploitation of indigenous resources, the diversification of energy supplies and use and the improvement of energy efficiency through energy management policies which included the set-up of energy regulations, financial incentives related to energy investments and the set up of the specialised energy and environmental protection agency, ADEME.

French energy efficiency and environmental policy has brought positive results. In a period of 20 years 8 MTOE of energy have been saved in industry and 7 MTOE in the building sector and the energy intensity has improved by about 40%.

The recently issued National Programme for Energy Efficiency (PNAEE[1]) is the practical translation as regards energy of the French Climate Change Programme.

- An agreement between the Government and the national agency for the environment and energy management ADEME clarifying the Agency's operational responsibilities and objectives
- New, tighter thermal regulations for new housing, tertiary and industrial buildings aimed at reducing energy consumption
- An energy saving programme for the industry, public sector buildings, including energy audits for existing buildings and industrial premises, and energy efficiency studies for new ones .
- Energy labelling for all sold or rented buildings

Energy Audit Programmes

Within this context, France has launched a full scale energy audit programme called "Aide à la Décision" (Decision Making Support Scheme or DMSS) in 1999. This EAP has complete management procedures, detailed guidelines, monitoring procedure and a charter for auditors. The programme has been launched by ADEME which subsidises audits by different percentages according to the used auditing model. The DMSS is targeted to all sectors (Building, industry) excluding individual single houses for which a self auditing tool usable from the internet is available. Since mid 2000, new energy audit models have been developed for street lighting and transportation fleets of vehicles. ADEME administrates and operates the whole scheme, local handling being dealt with at local level by its Regional subsidiaries (Delegations Regionales) whereas technical matters are undertaken by the technical central Departments for each sector (Building, industry, transportation, DSM,…) .

Other Programmes related to Energy Auditing

Energy labelling in the building sector

The Clean Air Act of December 1996 has made mandatory to provide to the future occupant, in any building estate transaction, an information on the conventional energy costs. This measure applies to all buildings that are rented or sold whether they are residential or non residential, existing or newly built. Although this disposition does not imply energy audits for the residential sector, it will make it compulsory for non residential buildings.

Other Activities related to Energy Auditing

[1] Programme Nbational d'Amélioration de l'Efficacité Energétique - December 2000

OPATBs

The PNAEE has settled that ADEME, together with the Ministry of housing and with the co operation of local authorities should launch 26 "city pilot projects" within 2006 where all buildings in a neighbourhood, a city or a rural area should undertake energy audits; investments will be supported up to 40% of overcosts or up to 10% of cost for a list of techniques.
In practice, OPATB's although being a programme in itself with its own rules (selection of sites by a Jury, specific animation/communication on site for the whole duration of the project,..) as regards audits will use the DMSS . As so it can be also regarded as one implementing procedure for audits. The call for tender is being launched in March 2002.

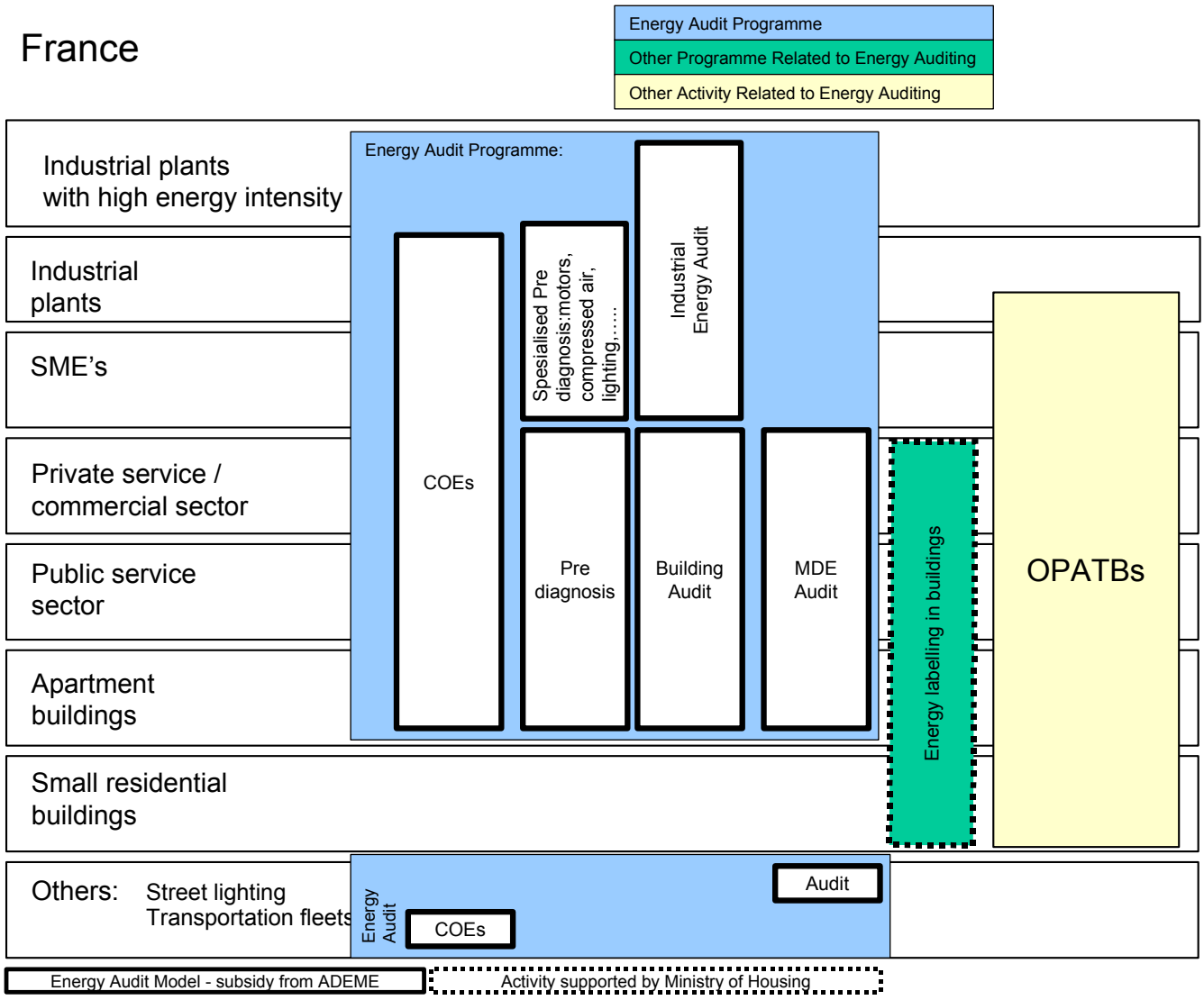

Table 1 - Table of EAP features coverage

	DMSS	**Energy labelling**
Status	**1999 -**	**2002 -**
Administration	ADEME	Ministry of Housing
EA models	++	+
Auditors' tools	+++	+
Training, authorisation	++	+
Quality control	++	+
Monitoring	+++	
Volumes, results	++	+
Evaluation	-	-

Table 2- Contact persons for France

EAP	Contact person	Organisation	tel	e-mail
DMSS : buildings	Hubert Despretz	ADEME 500 Rte des Lucioles F-06560 VALBONNE	04.93.95.79.00	Despretz@ademe.fr
DMSS: industry	Bruno Chretien	ADEME 2 Square Lafayette F-49004 ANGERS	01.47.65.20.00	Bruno.chretien@ademe.fr
DMSS: DSM	Robert Angioletti	ADEME 500 Rte des Lucioles F-06560 VALBONNE	04.93.95.79.00	Robert.angioletti@ademe.fr
DMSS: transport	Patrick Coroller	ADEME 500 Rte des Lucioles F-06560 VALBONNE	04.93.95.79.00	Patrick.coroller@ademe.fr
Energy labelling in Buildings	JM Delorme	MELT-DGUHC La Grande Arche F-92000 La Defense		www.equipement.gouv.fr
	Hubert Despretz	ADEME 500 Rte des Lucioles F-06560 VALBONNE	04.93.95.79.00	Despretz@ademe.fr
OPATBs	Didier Cherel	ADEME 500 Rte des Lucioles F-06560 VALBONNE	04.93.95.79.00	Didier.cherel@ademe.fr

Country Report

Country Report written by Hubert Despretz ADEME

Disclaimer

The information contained in this report has been gathered from publicly available sources and through interviews. All efforts have been made to secure the veracity of the report, however the author(s) cannot guarantee the content.

COUNTRY REPORT - Table of contents

1 Background and present national policy

1.1 Previous activities

1.1.1 Introduction

Over the last decades, energy policy in France has been driven by concern over energy security because of the first international oil crisis in 1973. Due to the above reason, France decided to increase its energy independence by giving high priority to the exploitation of the indigenous resources, the diversification of energy supplies and finally, the improvement of energy efficiency through energy management policies, including the set-up of energy regulations, financial incentives related to energy investments as well as the set-up of the specialised energy agency, ADEME.

1.1.2 The activities of ADEME

ADEME (established in 1992), merging AFME, the waste management agency (ANRED) and the Air Quality Agency (AQA), have been involved in activities aiming at the promotion of Energy Efficiency (EE), Rational Use of Energy (RUE), environmental protection – waste management and Renewable Energy Sources (RES). The activities of ADEME were funded mainly by direct government allocations and revenues from four taxes administrated by the Agency (taxes for industrial and municipal waste, atmospheric pollution, aircraft noise and oil spent). Most of ADEME's energy programmes have received additional funding from other sources, including regional authorities, the fund for the Depreciation of Electricity Costs (FACE) and the European Union.

In 1979, AFME had launched information campaigns in the framework of the National Instrument for space heating in the residential sector, in order to induce energy efficiency behaviours "Meteo Chauffage", aiming at informing customers about the need for space heating according to climate conditions.

ADEME (former AFME) has also been involved with "Regional Funds for Energy Efficiency" in the period 1984 – 1992. This energy activity needed the creation of local teams, as well as the involvement of local authorities in technical and financial support for rational use of energy. Partnership contracts of equal financial participation had been signed between AFME and regional authorities. The subsidies have mainly concerned space heating in local community patrimonies, hospitals and public/ commercial buildings, promoting decision making, energy analysis and demonstration projects for the dissemination of new energy technologies including boilers, heat distribution networks, air-handling and recovery systems and wall insulation. ADEME's contribution to these local energy activities was estimated to be about 123 MEcus.

Programmes, called Demand Side Management of energy (DSM-MDE), which involved energy auditing activities, became national schemes over the 70's (after 1973 and 1979 international oil crises). Since 1990, French government reduced such DSM programmes and by the mid-90's, new DSM policies have been developed, targeting three main directions:

- Information campaigns to promote energy efficient behaviour of customers
- Definition of thermal standards for new constructions
- Decision making through energy auditing and financial incentives (through the "Fonds Specials des Grands Travaux" (FSGT) financial scheme) incentives for buildings (local authorities, hospitals) and social housing. The scheme took place in the period between 1982 and 1986 and covered all the building sector also including individual houses, private collective dwellings and tertiary buildings

1.2 Present national policy

1.2.1 General goals

Fuel switching in France became a necessity since the first oil crisis in early 70's. Through this necessity, the share of oil in TPES (Total Primary Energy Supply) dropped from 70% in 1973 to under 36% in 1995, coal has also dropped from 16% to 6% resulting in the closure of most of the coal mines. The French government due to its strong infrastructure has taken an active role in planning its energy policy. Energy auditing activities have been introduced and implemented mainly by ADEME leading into improvements of energy security, competitiveness of French economy, improvements in end-use efficiency as well as the environmental protection.

In 1995, the Ministries of Industry, Environment, Science and Research, proposed the following measures to promote Energy Efficiency (EE):

- An agreement between the French government and the national agency for the environment and energy management, ADEME, clarifying the ADEME's operational responsibilities and objectives
- New, tighter thermal regulations for new housing, tertiary and industrial buildings aimed at reducing energy consumption
- An energy saving programme for public sector buildings, including mandatory energy audits for existing buildings, as well as energy efficiency studies for new ones carried out every five years
- Energy labeling for new residential buildings

Recently, the new government strategy with the participation of the Green party has been committed to support Rational Use of Energy (RUE), Energy Efficiency (EE) and the use of Renewable Energy Sources (RES), by allowing growing financial resources to ADEME. Considering the increasing level of French awareness on energy related issues in conjunction with the Kyoto commitments, it was decided that the new energy plan should start with supporting the "decision making" energy auditing and investment supporting services and extend it to consulting activities in order to start "marketing" the energy conscious process again.

1.2.2 Policy for the industrial and building sectors

The new energy policy plan allocates an extra 500 Million FF (76,2 M€) per year for ADEME's financial Support System in the field of Rational Use of Energy. These increased budget is to be allocated to.

- Financial support for energy related decision-making through pre-audits, audits and feasibility studies for the assessment of light and synthetic interventions or capital investments within the process equipment
- Financial support for demonstration and best practice energy projects (large-scale implementation of successful energy R&D results and of proven but less disseminated energy technologies)
- Energy managers in the industry sector and Energy information Centres (PIEs) for residential occupants will also benefit from this increased budget.

Policy instruments in the form of information and regulations have also been used for the residential, commercial and institutional buildings. Such instruments are:

- Two voluntary labelling programmes for new buildings. The label HPE (Haute Performance Energétique) was introduced in 1983 and modified in 1988 (further increased requirements in 2002). It targets buildings that have thermal performance greater than the required one. This is mandatory for all residential buildings in the public sector that are larger than 25 units.
- Since 1975, there is a requirement that the cost of collective heat should be based on individual consumption, where the technology permits. This regulation was revised in 1991.
- For the purposes of reducing the energy investment bills in public buildings, the French government allows the financing of equipment by leasing and through mechanisms, such as Third Party Financing (TPF).
- New regulations for non air-conditioned commercial buildings have been adopted on November 2000. Regulations concerning air-conditioned buildings should start the latest by January 1st 2003.
- Grants for low-income households to improve dwellings, which are more than 20 years old.

2 Energy audit programme

DMSS: The technical and financial scheme for energy audits supported by ADEME has been adopted by its Board of Administrators on February 1999[i] and made public through a press release of May 18th, 1999[ii]. The decision making support schemes encompasses all activities of ADEME - energy management , development of renewable, environmental assessment, waste management, acoustic nuisances… - and applies to all sectors (Building, Industry, Agriculture and Transport).

It defines two levels of "decision making support study"services : simplified/detailed

- Simplied studies encompasses pre audits and COE which are a technical advising on a single building or industrial premises from an expert for the former, and the same type of advising but on a large building stock (Local authority buildings, hotel chain, group of blocks of flats of a social housing organisation…) or on a group of industrial plants or a branch for the latter

- Detailed studies include general energy audits and some energy feasibility studies (cogeneration, BEMS, solar plants,..)

2.1 Programme goals

The launching of the programme of support, both financial and technical, to decision making or assessment studies is supposed to contribute to investments particularly in the field of RUE and RES. Objectives have been assigned to ADEME and are detailed in the agreement signed by ADEME with the State (CPEA[iii])

Table 3- annual objectives for the period 2000-2006

Sector	Type of service	Objectives	Expected Energy savings	Yearly budget allocation
Building	COE and pre-audits	2500 buildings	25 GWh[2]/annum	6,1 M €
	Audits and feasibility studies	2500 buildings		
Industry	Pre audits	600 in enterprises <5000 TOE/y	58 GWh/year	11,4 M€
	audits	350 in industries<5000 TOE/y 50 in industries>5000 TOE/y		

[2] The precise objectives are being expressed in TOE (respectively 25000 TOE/y for building sector and 58000 TOE/y for the industry)

2.2 Target sectors

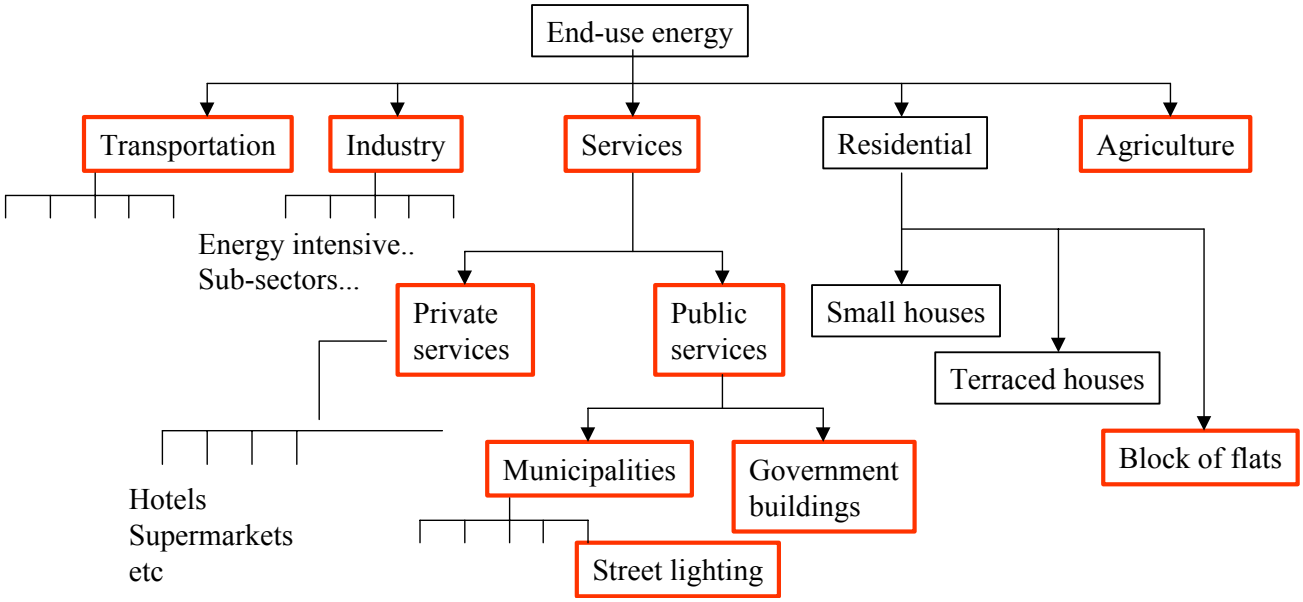

Figure 1 - presentation of target sectors structure and coverage

The French policy for the building sector decided to exclude individual houses from the decision-making support scheme, at least for the period 1999 - 2003.

All the other types of activities or premises are taken into consideration.

In the industry sector and for agriculture premises, all activities are considered, whatever the size of the premises or the energy intensity of the activity but two categories are considered:

- Industries or SMEs consuming less than 5000 TOE/year with a particular attention to those consuming less than 500 TOE/y
- Industries consuming more than 5000 TOE/y.

For transportation there are 2 main target sectors:

- Public transportation fleets
- Fleets of trailers

2.3 Administration

Through the Agreement with the State (2000-2006) which defines the strategy regarding actions in the field of Rational Use of Energy (but also waste management, soil pollution, air emissions….) and the objectives to achieve, ADEME assumes both the role of administrator of the programme and of operating agent thanks to the activity of its Regional Delegations network in close contact with the potential clients that are the energy consumers.

The links between the various key players are indicated underneath on a graph.

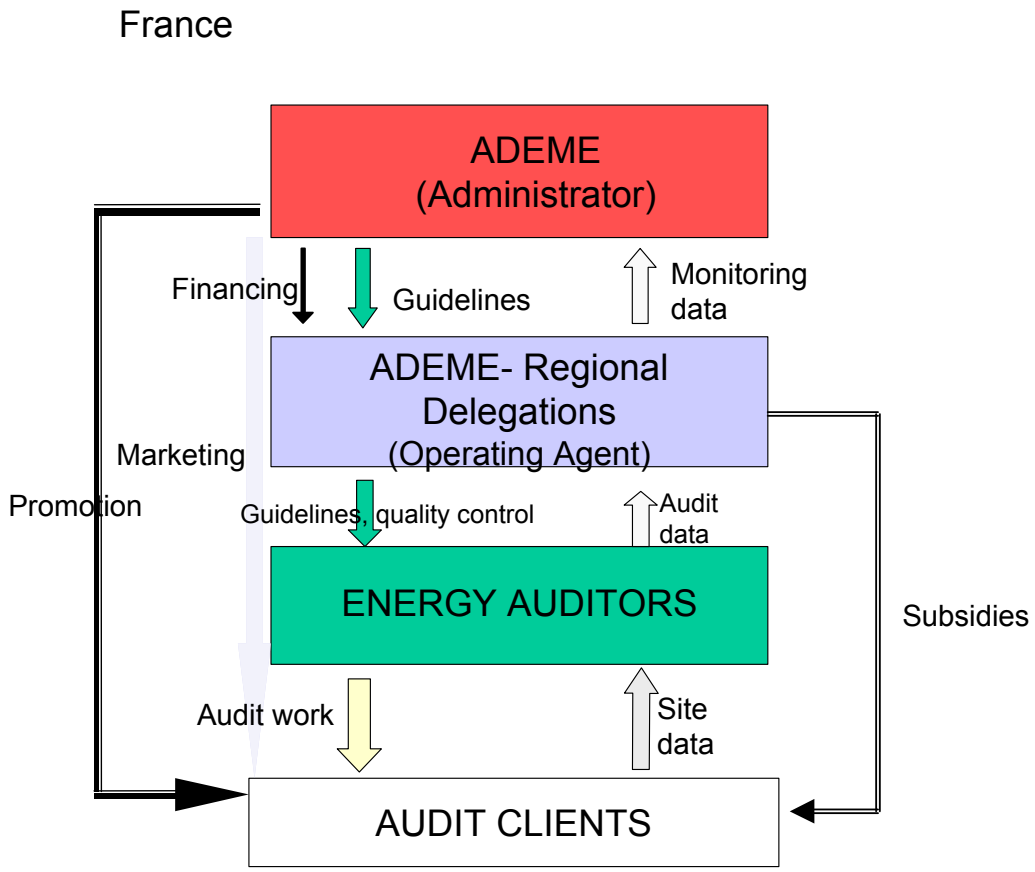

Figure 2 - French DMSS organisational structure

2.4 Implementing instruments

The whole scheme is voluntary. Compulsory audits in case of large renovations or on a periodic basis are under scrutiny but not adopted neither enforced. A variety of incentives are available for most energy consumers depending on the sector and the type of study.

Although there is still a project to make energy auditing compulsory in existing buildings, it has been estimated too early considering the state of awareness on energy matters. A first step will be to implement energy labelling and energy certification when buildings are sold or rented before imposing generalisation of audits (see following chapter).

Other implementing instruments are being made available especially in the industry sector where investments in the energy field can benefit a bank guarantee when an audit has been conducted and approved by ADEME beforehand. This is the FOGIME scheme whose main goal is to foster energy conservation investments by facilitating the access to loans for the industry sector but which "side effect" is to encourage and develop energy auditing.

For the industry sector also, an agreement is running between ADEME and the Regional Chambers of Commerce which allows some staff of these organisations to promote and market energy pre audits in SMEs.

The OPATBs [3] (see further under chapter on Other activities related to energy audits) will be a strong instrument to market energy audits in the concerned areas. Some investors or sponsors might make compulsory, an audit before according bank loans or subsidies.

Table 4 - Implementing instruments for the DMSS EAP

Mandatory / legal schemes	**Voluntary schemes**
No links to mandatory or legal schemes	To date energy audits are a voluntary process.
Fiscal incentives (taxes)	**Fiscal incentives (subsidies)**
There exists no link to the tax scheme any more except for owner occupied dwellings or houses who can benefit tax reduction according to the amount they have paid an energy audit.	See table below.
Marketing oriented schemes	**Policy issues**
The decision making support scheme is marketed by ADEME through its network of Regional Delegations. Other opportunities (fairs, communication campaign,.. at national and/or Regional level) are taken advantage of to advertise the scheme	Energy audits are a component of the National Climate Change Programme and the PNAEE (National Programme For Energy Efficiency)

[3] French acronym of "Operation Progarmmée d'Amélioration Thermique des Bâtiments" which can be approximately translated into Planned Thermal Retrofit of Buildings in a Neighbourhood.

Table 5 - Financial support by ADEME of the various EAMs in DMSS (all amounts in Euros, VAT included)

Sector Maximum support	Content of Auditing Model	INDUSTRY (incl. Agro-food)	AGRICULTURE	BUILDING	TRANSPORT
COE **70 %**	Simplified approach on stock of premises	Collective action in a branch or stock of premises approach Maximum :cost: 75 000 Euros.		Maximum cost depending on number of buildings	Large transportation fleet
Pre diagnosis (pre-audit) **70 %**	Raising awareness, check up and identification of straight forward improvement, rapid evaluation of potential gains.	Cost : 2 300 Euros support : 90 % until end of 2003 then 70%			
Audit **50 %**	Detailed audit	Maximum cost: 30 000 Euros		Maximum cost depending on building size	Maximum cost depending on number of vehicles
Feasibility study **50 %**	Detailed study on a specific (energy) technology.	Maximum cost : 75 000 Euros			

2.4.1 Promotion

The promotion of the whole decision support making scheme (all thematic to all sectors) has been made through the dissemination of leaflets and the articles in ADEME's newsletter (plus information on line on the web site). The leaflets are sector oriented: Industry (& agriculture), building, Local authorities, Transport and present:

- the financing scheme
- examples of questions one has to raise on the various matters: energy, air pollution, waste,..

The financing system is also presented on ADEME web site (www.ademe.fr)
The DMSS general programme has been advertised through two general information campaigns not referring directly to audits but aiming at raising public awareness on ADEME's activities: one in September 1999 focusing on environmental topics (waste, air pollution,…) in magazines and the daily press. The second one by a series of TV spots emphasising the relationship between energy and greenhouse gases emissions effects in 2001.

2.4.2 Marketing

The preliminary marketing activities have been limited to inquiries on the cost of the various services in order to assess correctly the maximum cost tables (in the building sector).

As the scheme goes on a few surveys have been launched to have a better understanding of the appraisal both by audit clients and by energy auditors of the different aspects of the scheme: costs, support level, content of auditing models and specifications…

A further demand comes from the Regional delegations in charge of marketing the product to have "sales talk" support documents to improve their marketing abilities and be able to convince more easily the potential clients from the different target sectors.

2.5 EA models

In ADEME scheme, each energy audit model is defined by a document called "specifications" which is the reference of the work the auditor will have to carry out. New or updated specifications are elaborated when needed upon demand of the Regional Delegations in two distinct situations:

- either because a new type of service is required by clients: appreciation of summer comfort parameters is an emerging demand which is different from general energy audits in the building sector
- or because a specific situation requires particular developments: example, although the general specifications for energy audit in building apply, the case of computer centres must be addressed in a precise way with description of adapted metering etc…

Specifications, when adopted (it is an iterative work between Regional Delegations and Technical Departments, involving eventually external experts) are published on the ADEME's intranet and thus made available to all Regional Delegations for them to hand out to clients and auditors.

The existing models for the time being are:

In the Industry sector
- Pre audit for lighting
- Pre audit for compressed air
- Pre audit for food refrigeration
- General audit of an industrial site

In the building sector
- COE (light pre audit on all the property holdings of a public or private building owner)
- Pre audit on a building
- General energy audit on a building (with variants for swimming pools, catering, computer centres)
- Audit for street lighting
- Feasibility study for BEMS and remote control and management
- CHP (under preparation)

For large fleets of vehicles, ADEME has also developed a two steps approach with:
- COE
- audit

The different model maps presenting scope and end uses coverage are attached as annex to this report

The *pre-audit* or "*pre-diagnosis*" service is an auditing activity based on a visit to the building/premises and on the expertise of the consultant. This auditing activity must take place within two days (with a fixed price of 12,000 FF – 1,800 Euros). The objective of the "pre-diagnosis" service is to promote a new interest in energy management and energy conservation by proposing simple and cost-effective actions that can be rapidly implemented. In practice it is an intermediate study service between a scanning type audit and an analysis type. It requires from the auditor a lot of personal knowledge to scan all potential defaults and thus propose the corresponding energy conservation options (ECOs) but he is also asked to

provide (without or with little) calculation a breakdown of energy consumption by end uses, and an evaluation of the potential gains both in kWhs and in Euros.

The *COE* service is similar to the pre audit in the sense that it is based on a quick visit of the premises and the expertise of the auditor, but it applies to the whole building stock of the client. For example a local community will have a COE carried out on its various buildings: town hall, schools, administration, sport centres,…in order to assess the order of magnitude of energy consumption by end uses, to spot out urgent and easy to implement retrofits, revising energy contracts or subscriptions and identify those few buildings that deserve a more detailed approach (audit or feasibility study or MDE specific,…)

The *audit* is a detailed study of the analysis type with 3 main steps:
- collection of data on the site and use of a calculation tool to simulate the energy consumption for all end uses
- comparison with actual consumption and identification of potential gains
- list of all energy conservation options, calculation of the costs and benefits and proposal of a retrofit programme to the site manager, technically and financially consistent with his possibilities.

A visit on site is mandatory (several visits may be necessary), as the writing of a report and a presentation of the study conclusions to the client.

As a consequence of the monitoring and evaluation being prepared, the auditor will have for any type of EAM, to provide a summary sheet of the study. The summary template (which is very similar from one target sector to another, and within one sector which is the same for the different EAMs) is part of the specifications or guidelines.

Auditing Models development

The first "general energy audit" model originated in the 80's when AFME (former ADEME) was in charge of a large investment scheme in the public buildings sector (local communities buildings and hospitals) that was supposed to foster activity and employment through energy retrofits in those buildings. Prior to investments, an energy study was required and AFME elaborated the first guidelines. The investment supporting scheme was then enlarged to other building sectors (social housing) and the industry sector which made the thermal energy audit a common study among consultants and engineering companies.

ADEME's Regional Delegations (which were created in the mid 80's) elaborated at that time a lighter study, oriented towards a wider evaluation of building stocks which they called the COE (Conseil d'Orientation Energétique - Energy Advising). This resulted from a demand of one major partner who are the local authorities who have to deal with a building stock, street lighting, sometimes water supply or distribution, vehicles,…) and wanted a global approach of their energy costs and expenses. For these historic reasons, it may still frequently appear that street lighting is incorporated in the work programme of a COE….

Most of these activities were abandoned in the 90's due to low involvement of policy makers on energy matters except in a few Regions were the Local Regional Parliament decided to carry on.
The renewal of the scheme was decided in 1998 as part of the Climate Change French Programme. In order to help marketing energy studies especially in private condominiums the pre audit was elaborated with an attractive support (low cost and high incentive) and a rather simplified approach, similar to the one in COE but on one building (or industrial premises).

All these models are elaborated within ADEME. Energy decision making studies do not enter the general framework of engineering activities as defined by the Law and thus, the only definition of the study contents and results is incorporated in the guidelines/specifications.

Audit models costs
In the industry sector no other limitations than those indicated in the table of financing means is required.
In the building sector however, maximum indicative figures have been elaborated. Although they can be overridden on specific studies upon acceptation of ADEME's local agents, they constitute a rather good indication on the average costs of the various services:

Table 6 - Indicative Price list as of 2000

COE :

	Cost of study per building
4 to 9 buildings	320 €
10 à 19 buildings	290 €
20 à 50 buildings	259 €
>50 buildings	244 €

Pre audit :

Per building	2300 €

Audit in collective dwellings :

	Cost per study for one building
2 à 50 dwellings	1219 € + 30 €/dwelling
51 à 100 logements	1981 € + 15 €/dwelling
100 logements et plus	2363 € + 11 €/dwelling

Audit in non residential:

<500 m2	1143 €
500 à 2000 m2	762 € + 0.76 €/m2
2001 à 10000 m2	1067 € + 0.61 €/m2
>10000 m2	3354 € + 0.38 €/m2

2.6 Tools and Software

In the ADEME procedure, decision making study specifications do not impose any particular tool or software but require that calculations are conducted with a certain degree of accuracy and with identified type of results. As a consequence tools and software have been developed both by ADEME and by other organisations (EdF, the electric utility) or private editors.

Industrial sector:
No particular development although a tool (method + software) for process energy analysis (MINERG) was developed in the 80s in co-operation with industry technical centres and the method is still used by a few auditors .It was able to sketch out the various energy flows entering a manufacturing process and take into account modifications on the parameters to evaluate energy efficient scenarios.

Building sector:
ADEME has developed and distributes for free several tools (under some training conditions)

- A CD ROM describing the principles and proposing a calculation method (méthode de diagnostic V99) for audits in buildings (non air conditioned)
- A software called AMICE to help in collecting, combining and presenting data in the case of COEs (many buildings, rough approach based on bills and ratios)
- An excel calculation sheet called COIND'TABL that can help precise potential gains and savings for pre audits . Pre audit specifications DO NOT require detailed calculations BUT demand rather accurate savings predictions which seems rather impossible to provide without at minimum rough calculations. This calculation sheet can be used for all buildings type where heating represents the major energy end use and which do not need to "declare" more than 4 or 5 thermal zones.
- The MEDIADEME software which is the computer version of the "méthode de diagnostic". Version 2.1 was released as a beta version in Marsh 2001, and a "commercial" version (v2.2) is expected to be released beginning of 2002.

Table 7 - Summary table of audiors' tools in the building sector

Energy Auditing Model	*Tools : document type developed by Operating Agent*	*Tools: software type developed by Operating Agent*
COE	Memento (guide for visit + report template)	AMICE
Pre-diagnosis		COIND'TABL
General Audit	CD ROM: Guide for energy auditing V99	MEDIADEME
Street lighting audit	Guidelines	

ADEME has also prepared a data base on available private or public software that can be used in the different EA models. This data base will be available on the ADEME web site in 2002. As an appendix is attached a detailed list of the fields in the database and a summary on the indexed software

NOTE: Although the DMSS does not apply to the individual homes, it seems necessary to provide the house owners with some service. It has been decided to provide a free of charge service by making available to anybody a self auditing tool. It can be accessed on the Internet (http://kiosk.interconsult.com/) and is called HESTIA which stands for Home Energy Software Tool on Internet for Audit. It is a collaborative project of several energy agencies in EU which was supported by the EU Commission . . This is a simple software tool that the house occupant can use to calculate its energy consumption and cost and have an evaluation of the potential savings. It takes 15 – 20 minutes for the self-auditing tool to answer the different fields and also display the results
Transport: no particular tool has been developed but a data base on conventional energy index of vehicles is maintained by ADEME.

2.7 Training & authorisation (inc. Quality control)

Any energy professional (provided he is independent from an energy supplier or a manufacturer) may carry out audits . he must comply with the EAM specifications and the audit report will be evaluated by the Regional Delegation of ADEME before payment of the incentive to the building or industry benefactor.

In order to improve the quality of the service, ADEME organises :

- training sessions for auditors; The most recent analysis has given poor results attributed to the fact that only a few energy consultants invest on knowledge and experience acquisition related to energy audits. Therefore, there is a need to introduce and initiate training sessions and information tools. Considering the above-mentioned results, ADEME has decided to set up "training tour" sessions organised in various locations throughout France. These "training tour" sessions will give consultants the opportunity to improve the quality of services and therefore, the quality of advice towards building managers.
  The contents of the training sessions are sector dependent thus differing between industry and building and conducted separately because it has been observed that consultants are not operating on both sectors. The basic components of a 2,5-3 days sessions are:
  ° presentation of the scheme and introduction to the EAMs guidelines
  ° Description of the most frequently encountered errors or omissions and suggestions on how to proceed for the corresponding calculations and analysis. The errors have been collected and compiled from audit reports.
  ° Presentation of software and training on ADEME's software tools (which are distributed for free to training sessions participants°
  ° carrying out of two case studies by trainees (without site visit) based on actual situations
- ADEME's staff also benefited from training sessions (which were organised in September 2000 for the agents in charge of industry and in December 2000 for those working on the building sector) with the same content, except for the case studies which were replaced by a test examination of actual audit reports for comments.

- chartering of auditors; not obligatory but ADEME will publish lists of chartered consultants. The quality of the service is mainly relying on the expertise and qualification of the energy consultants; therefore, an agreement for technical (qualification, experience, software used) and non-technical (training, code of ethics) requirements can be signed between ADEME and energy consultants. Although membership is voluntary, ADEME will publish updated lists of members, which would give chartered energy consultants a marketing advantage. The charter is signed by the company or consultant firm with indication of the names of the concerned auditors. The list of chartered auditors is rather short : about 60 in the building sector, 50 in the industry sector. The total list of consultants referenced by ADEME in all domains (including acoustic, soil pollution, transport, environmental assessment,…) is of 870 companies.

- quality control of audits. When the study is not satisfactory (upon request of the client or because the Regional Delegation has judged so) and the auditor does not improve his work, ADEME may convey an independent expert to redo the study and eventually expel the auditor from the list. Some reports are also checked on a random basis . In practice there are quite little complaints from clients because of the follow up that is made by the ADEME's agents in the Regional Delegations. As the scheme will grow up there might be a general improvement of the quality and also an increase in clients complaints because the colleagues in the Regional Delegations will not be able to control all reports. At present time only a small number of consultants are working in this field and although the quality of "draft" reports is rather unsatisfactory it is possible to check all and help improve the "final" report that is presented to the client. When the scheme is up and running we expect to have an in depth control and checking rate of 2% of audits (from complaints and random selection), representing 100 to 150 buildings to be re-audited each year (projected budget of 500 000 Euros/year). In 2001 no more than 20 to 30 buildings have been completely re audited (by an independent auditor) because of the poor quality of the initial study.
- In all cases, prior to exclusion from the list of chartered auditors, the consultant is requested to attend a training session.
  A chart (describing the various stages of quality control is inserted hereafter. Rejection percentages are rough indications based on opinion of ADEME's agents in Regional Delegations. There is no accountancy kept of the quality control which is very dependent on the personal skills and knowledge of the agents locally involved.
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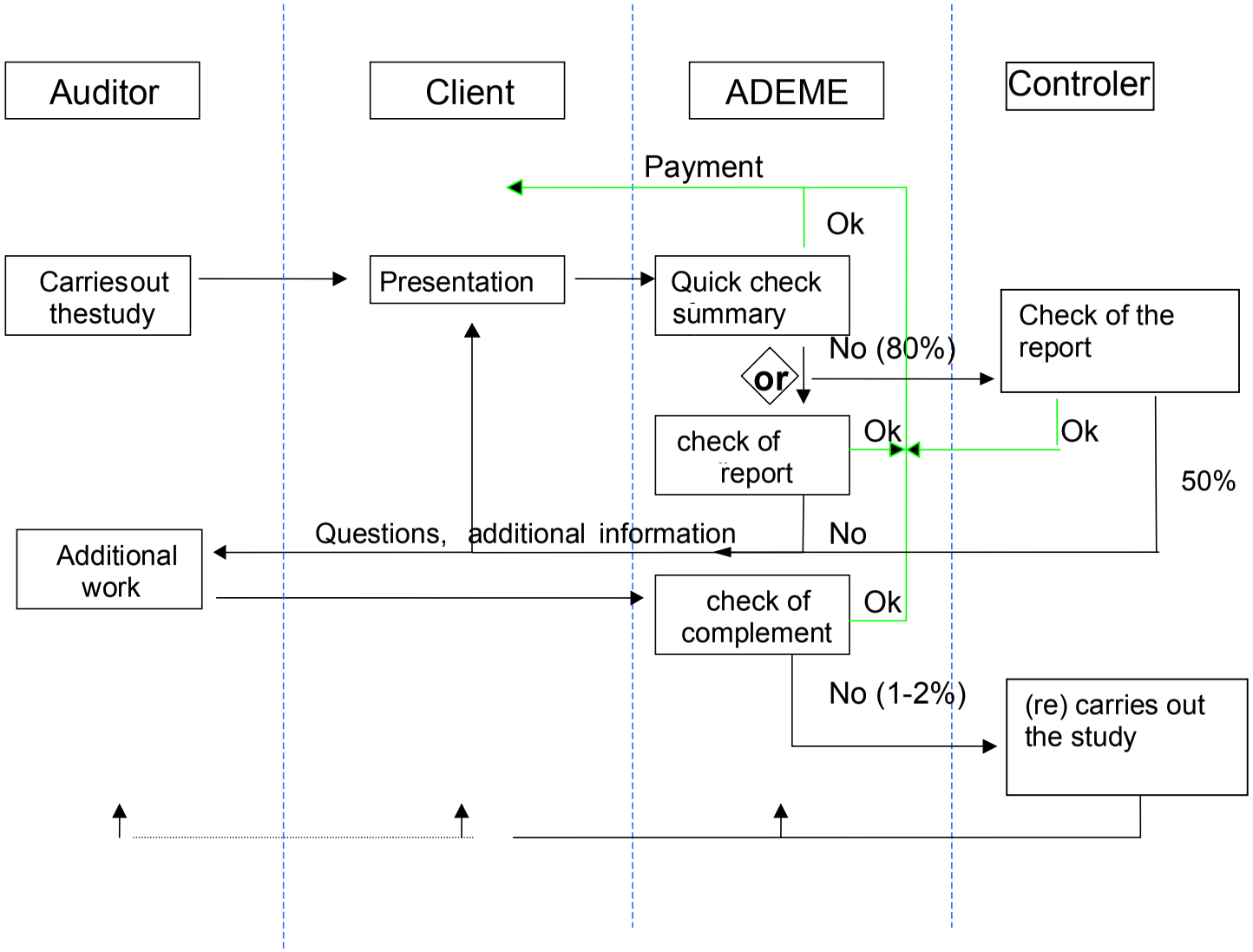


Figure 3 - Quality control of audits steps and flow path

2.8 Monitoring & Evaluation

1. Monitoring

Monitoring of audit studies in the DMSS has two aspects:

- monitoring of the activity : type and number of audits, number of buildings, size, costs, incentives….
- monitoring of the audit "find outs": synthesised technical information on the building energy consumption break down by end uses and principal features (type of use, size, age, localisation,… + list of recommended energy conservation options with for each :title, cost, saved energy, money savings and projected implementation delay

Monitoring of activity is conducted through the central computer accounting system of ADEME, each contract for the allocation of a subsidy requiring additional "technical "information (type of study, number of buildings and/or heated area, name of auditor,…) before being validated.
This system allows monitoring of the activity and gives complementary information on the costs of the various EAMs which may be helpful to reassess the cost price list.

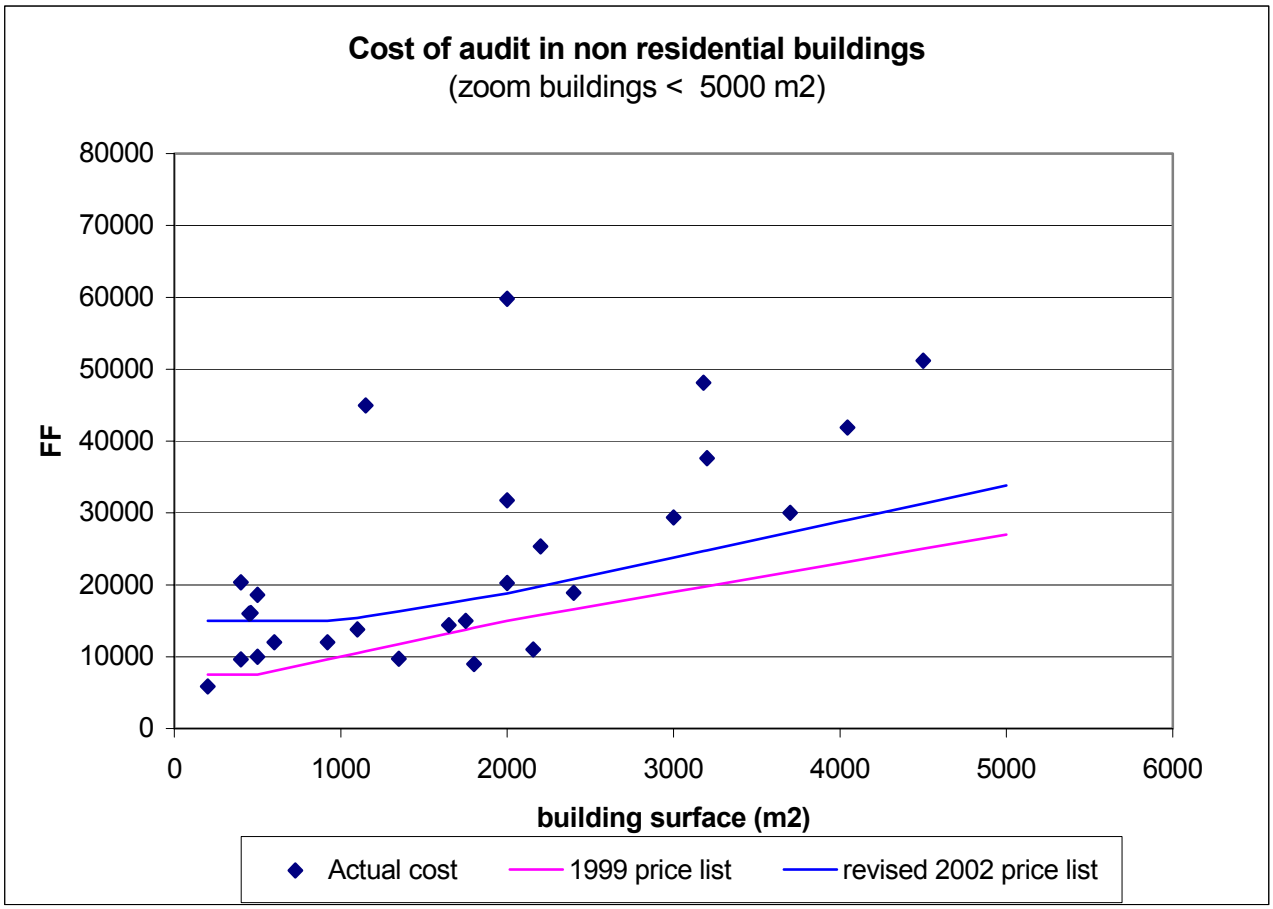


Figure 4 - Comparison between actual cost of audits and price list values

The audits conducted in 2000 have been used to control price evolutions. The theoretical formula used as a basis for price calculation appeared to underestimate costs in small and medium size buildings (red line) and thus a new proposal (blue line) has been made to enter into force in 2002.

Additionally each contract requires from the benefactor to send back to ADEME a synthesis paper sheet "proforma" on the audit results. Theses sheets are collected periodically in the Regional Delegations and a sample is analysed every year. This synthesis sheet contains the technical information that should allow to evaluate the total identified potential gains

For the building sector, the synthesis sheets are recorded by the auditor on a web special site (www.evalure.com) and thus each Regional Delegation has access to the results of all the studies conducted within his area. They can download the corresponding database and carry out any evaluating work. The same type of analysis, at National level, is done by the Building Department in ADEME (see in annex a synthesis assessment as of March 2002 of the information extracted from this system still in its development stage in a few Regions).

2.9 Auditing volumes (activity)

The following tables indicate the number of audited buildings (respectively industrial sites) and the corresponding subsidies as allotted by ADEME since the beginning of the scheme in 1999.

Table 8 - DMSS activity from 1999 to 2001

Building sector	1999		2000		2001	
	K€	nbr of build	K€	nbr of build	K€	nbr of build
COE	**203**	**364**	**505**	**2 387**	**151**	**600**
Pre audit	**196**	**223**	**654**	**337**	**676**	**643**
Audit	**568**	**116**	**580**	**587**	**659**	**971**
Feasibility studies	**569**	**57**	**422**	**1641**	**714**	**875**
Total	**2 033**	**846**	**3 596**	**5 067**	**2 200**	**3090**

Industry & Agriculture	1999		2000		2001	
	K€	nbr of operations	K€	nbr	K€	nbr
Total			**1 653**	**367**	**2 694**	**343**

2.10 Results

The results that are sought after from the energy auditing programme are not the audits themselves but the retrofits that will be decided and implemented as a consequence of the "decision support scheme". There are several difficulties in monitoring and evaluating properly results of auditing schemes, the principal one being the delay between the study itself and the retrofit implementation. Whereas it is rather short in the industry sector, it can be long in the building one because decision process is slow, works have often to wait until the heating season is terminated, …

In France follow up of retrofit implementation is (will be) conducted through a periodical survey of a sample of audit clients.

Lessons drawn from first experience

The collecting of paper summary sheets has proven very disappointing in most sectors and in most Regional Delegations. There are numerous explications to this failure:

- ADEME's agents are not sufficiently strict on the return of the sheet neither demanding on the contents
- Information in the summary sheet is poorly (hand) written, or missing or inappropriate
- Recording information (for further computation) is a tedious work that requires detailed skills on audit to interpret the written information and can not be entrusted to a typist.

Lessons from the pilot experience in the building sector

Although the test was limited to 5 regions (out of 26) and benefited from no particular support to ADEME local agents neither of particular information to auditors, in these regions the recording rate (for achieved studies) is 80%. Some technical and practical difficulties have been spotted out and are being solved in the updating of the web site (www.evalure.com) beginning of 2002 with the switch from French Francs to Euros.

Table 9 - Example of possible exploitation of recorded audit summary sheets

	Investments (k€)	Savings (k€)	Savings (MWh)
Total potential	10 413	766	10 091
With pay back less than 8 years	608	227	3 380
Declared as being implemented within 12 month	5 403	343	5 862

These figures result from the recording of 77 studies of which 42 are completed (19 pre-diagnosis, 6 COE and 17 audits) representing 214 buildings in December 2001.

Table 10 - Breakdown of suggested ECOs investments

Type of ECOs	% of total investment
Building envelope	24,3
Doors and windows	21.0
Lighting	0,2
Sanitary Hot Water	0.7
Energy management	0.1
Heating & cooling	14,2
Ventilation	0.8
Other	38,6

Note: The category "other" collects ECOs that are not recorded using the window menus but in fact covers all other types. A few categories are not mentioned here (ECOs on appliances, electronic hardware, cooking appliances,…). This indicates that the different menu lists will need to be revised.

Actual results of the EAP

No result is available to date.
The objective of the audit programme is to trigger off investments in RUE. The evaluation will try to assess how much investments have been decided on the basis of the audits results and recommendations.
In order to do so a sample - that is a limited number of audits (10% ?, 20% ?) - will be selected for a survey . Facility managers will be interviewed to get the information: which work was(were) recommended, what has been implemented. This survey is planned in 2002 because the auditing scheme really started only end of 1999 and it takes some time to decide and implement the investments after the audit has been completed.

2.11 Evaluation

The programme started in 1999 and should run until end of 2006. No evaluation has been done already.

2.12 Comments and highlights

Although launched in mid 1999, the auditing scheme has only practically started in 2000 on a rather slow pace for various reasons, the main one being the fact that it takes some time to build a network of efficient consultants in the field of energy auditing.
Effectiveness of the scheme can only be appreciated on the mid term when both the clients and the consultants are well informed of the whole business and some time has gone for to let energy managers take the decision to invest according to the recommendations that are listed in the reports.
Many tools are still not fully available, which may hinder the work of consultants, and training has not fully started yet.

3 Other programmes related to Energy Auditing

Energy labelling in Buildings

Clean Air Act of December 1996 has made compulsory during building estate transactions to provide the future owner or renter with an information on the conventional energy costs. The implementation decrees of this measure are under preparation and should be issued within end of 2002.

3.1 Goals

The main objective of this mechanism is to give the future occupant an information allowing him to compare the market offers. Similarly to what has happened with domestic applainces, it is expected that the main consequence will be that the premises seller or lesser will undertake energy retrofits before offering his premises. Whereas in the residential sector, the energy costs might not be a determining information or criteria in the choice, it should be different in the services or industrial buildings for which an energy audit by a professional will be necessary to ascertain the energy costs, even on a conventional basis.

3.2 Target sectors

All building spaces, either resdential or non residential, newly built or existing, being object to an estate transaction are concerned.

It is assumed that in the residential sector for stand alone individual houses or apartments, the conventional energy costs can be self evaluated . For all other types of premises (being rented or sold), an energy auditor will have the responsibility to establish the energy cerificate.

3.3 Administration

The whole scheme being still under development, no formal structure has been retained. The administrator will be the Ministry of Housing who will delegate this work to another organisation. The operating agent for most regulatory actions is the CSTB (Scientific and Technical Center for Buildings). In this case, this organisation having little background in the field of existing buildings and energy audits, ADEME might take in charge the scheme for those premises necessitating an audit: services and some industrial or agriculture premises.

3.4 Implementing Instruments

Table 11 - overview of implementing instruments for energy labelling in the building sector

Mandatory / legal schemes	**Voluntary schemes**
The energy labelling is compulsory according to a law when a building is sold or rented. Implementing decrees will define the practical means of its running.	
Fiscal incentives (taxes)	**Fiscal incentives (subsidies)**
Not applicable	The audit in itself may be subsidised under the general DMSS, at least for existing non residential buildings provided it is conducted according to the respective EA model
Marketing oriented schemes	**Policy issues**
The energy labelling will be disseminated through a collaboration with estate agents. Consumers association support strongly this measure and will thus be associated to the general public information as well as energy utilities.	Energy labelling is a component of the National Climate Change Programme and the PNAEE (National Programme For Energy Efficiency)

Many practical features of the energy labelling programme are still under discussion and might be postponed to find the best synergy with the Building Energy performance Directive to be released soon by the Commission.

3.5 Energy Audit Models

To date one general auditing model only will be used. As the calculation is based on many conventional data, especially as far as occupants behaviour is concerned, the on site visit is limited to the recording of factual data relating to the building envelope and the various energy systems for space heating, and Domestic hot water production. All information related to lighting or electrical appliances is incorporated on conventional data basis.

For non residential buildings, the general comprehensive energy audit of the analysing type will be used. A set of pre choosen values reflecting conventional behaviour and equipment will be used.

3.6 Auditors' Tools

A calculation software has been elaborated for individual houses because the energy labelling should be self evaluated, the house owner being responsible for the validity of the used data and figures. A prototype version is accessible on ADEME's web site at URL:

http://www.ademe.fr/auto-diag/dcl6/

3.7 Training, authorisation and quality control

In the housing sector, the labelling is based on self evaluation and declaration. There is no need for an external auditor which simplifies the organisation regarding training and authorisation.

For non residential buildings two options are under consideration:

- either the scheme is based on the same features as DMSS (no particular autorisation)
- or the Ministry of Housing delivers a qualification to those consultants who will apply for it with considerations on their experience in the field of audits (ADEME will be advising the selection committee based on the DMSS experience and feed back)

As it will be a mandatory disposition, a quality control will be organised by the Ministry of Housing through its network of technical centres. Controls will be made on a random basis, and also upon complaint.

3.8 Monitoring

No plan has been made to date

3.9 Auditing volumes

In the housing sector about 1 million estate transactions occur every year. Very little precise information is available on the non residential sector which is concerned by this mandatory disposition. It is expected that it will mainly concern the privately owned non residential buildings such as hotels, offices and retail. The number of estate transactions is estimated between 100 000 and 500 000 per year.

3.10 Results

None to date

3.11 Evaluation

None to date. The effect of energy labelling is supposed to act on supply side in inciting building owners to refurbish their "products" (or seek higher performance in new constructions) before offering them on the market. Collecting regularly energy certificates - through estate agents and lawyers - should allow to have an analysis of the real nature of the effect.

3.12 Observations and Future Plans

The programme encounters many obstacles - although it is legally compulsory - due to the fact that many key players (energy utilities, mostly the electric utility) do not wish its rapid implementation considering it could hinder their market penetration.

4 Other Activities related to Energy Auditing

4.1 OPATB

OPATB is the French acronym for a new concept of energy retrofitting of all buildings in a large neighbourhood or in a town. 26 pilot operations will be launched over the two next years (2002-2003) after selection of the most promising sites. They should then be continuing until 2006.

All buildings or premises (private-public, residential as well as tertiary or industrial) will be concerned when they are located in the selected area. Their owner or manager will have to conduct one kind of energy auditing or another (most appropriate one). Financial support will be also available for the investments through tax refunds, special banking products and subsidies.

The energy auditing activities will enter under the general programme described under 2.1 but the implementing instruments will be different because:
. a local organisation will ahve to do the promotional work and be on site to provide all residents with the information.
. for each type of site or building owner, appropriate susidies for investments will be made available, ADEME will take in charge the services sector and provide a 10% of the cost or 40% of the overcost incentive on investments. Other disposition will be made available through the Ministry of housing for the residential sector (social housing, rented houses, …). Tax credit in the form of rebate on direct taxes on individual income will be afforded to individual houses or apartments owners.

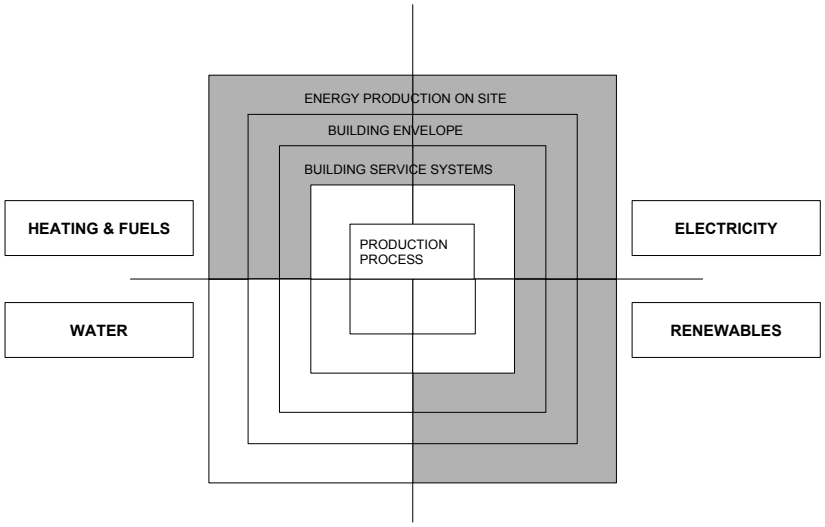
4.2 Local Energy Information Centres (PIE)

In order to foster awareness on the need to use energy in a conscious way, ADEME is setting up a network of local energy information centres (PIE for Point Info Energy). It is expected that 500 PIE will be operating by end of 2003 providing advice on energy topics to 250000 energy consumers.

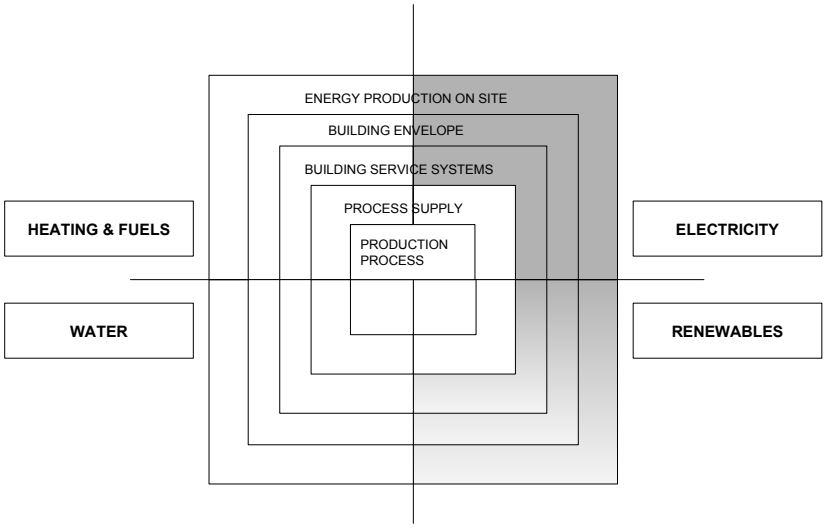
This organisation will complement the availability of a self auditing tool for individual consumers that is accessible via Internet: HESTIA (Home Energy Software Tool on Internet for Audit) is a product developed by a consortium of EU based Energy Agencies (http://kiosk.interconsult.com/).

ANNEX: Energy Audit Models Maps

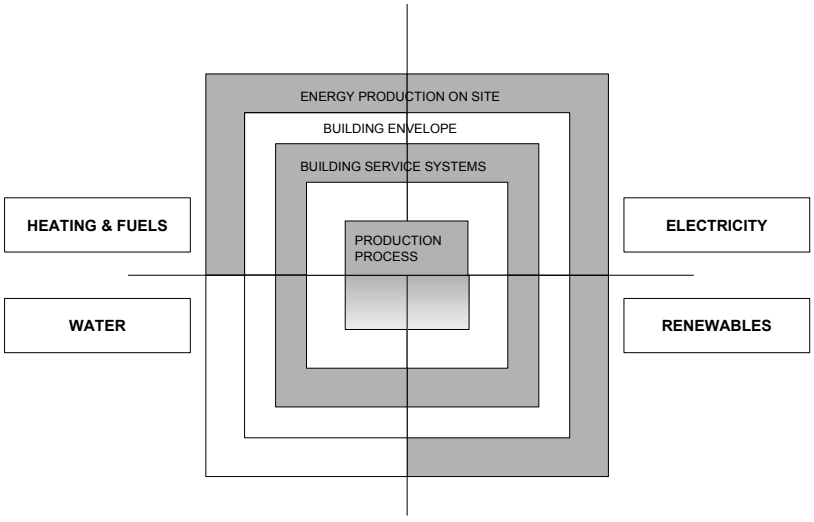
BUILDING
ENERGY AUDIT and PRE AUDIT



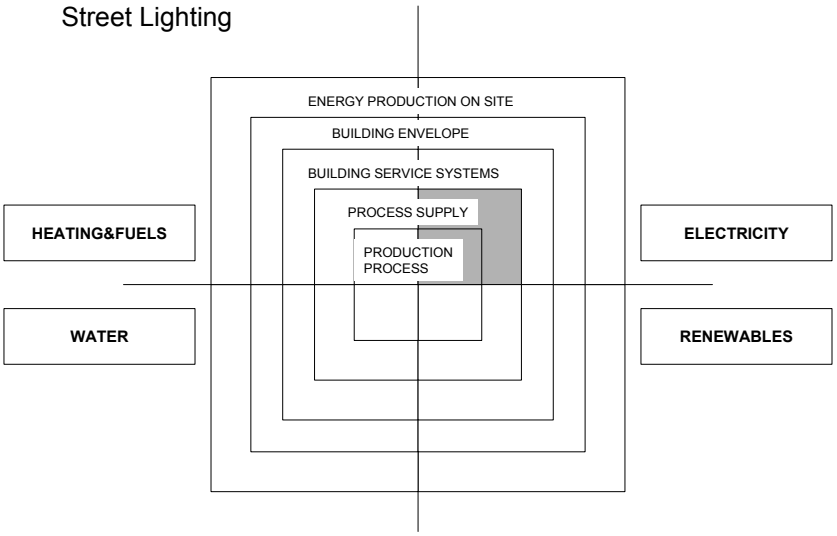
BUILDING
MDE AUDIT



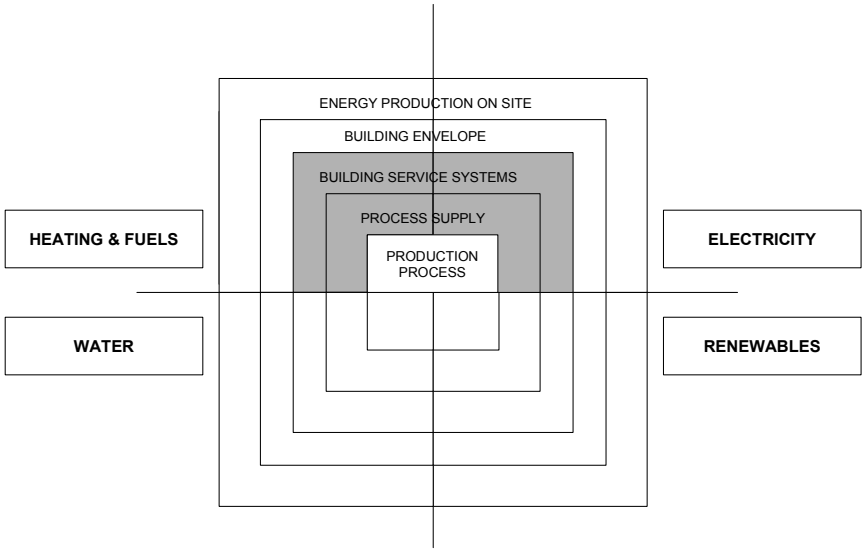
BUILDING
BEMS feasibility study



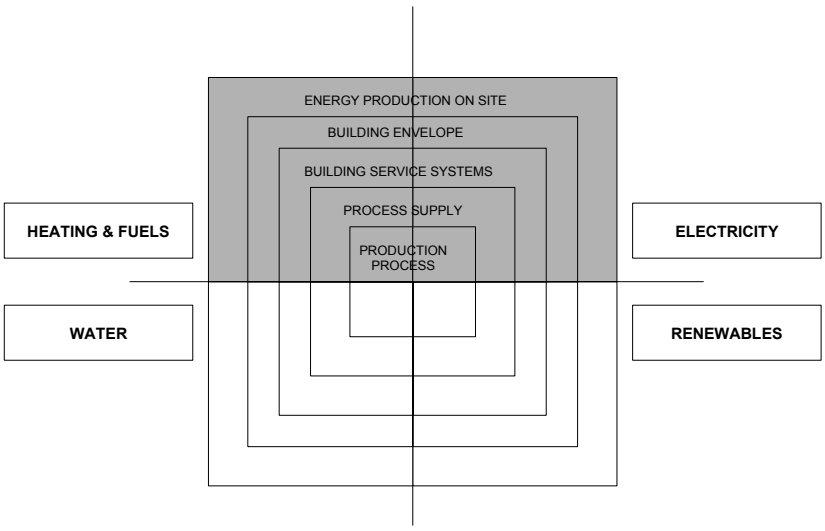
FRANCE
DMSS
Street Lighting



INDUSTRIAL
ENERGY PRE AUDIT



INDUSTRIAL
ENERGY AUDIT



Appendix: **Quick exploitation of WWW.EVALURE.COM**

The on line data base contents as of 31/12/2001 are :

- 77 contracts recorded (by Regional delgations)
- 41 contracts with data recorded (by consultants)
- 180 buildings (corresponding to these 41 decision making stuides)
- 335 recommendations of energy conservation opportunities (some still missing information)

Size	ND	<500m2	500-1500	1500-3000	3000-4500	4500-10000	>10000m2	total
Nbr of buildings	7	65	51	27	14	9	7	180
Total surface (m2)		17989	44396	60374	51822	51898	560144	786623
Average (m2)		277	871	2236	3702	5766	80021	4370

Breakdown of ECOs by type

Type of ECO[4]	Cumulated cost (Euros)	Cumulated savings (Euros)	Savings (kWh)
type1	2 532 158	67 282	2 584 457
type2	2 188 725	30 345	1 162 303
type 3 to 5	20 839	3 923	43 678
type 6	72 309	11 705	374 555
type7	17 160	49 837	75 500
type9	1 474 343	181 496	3 663 695
type10	90 536	8 790	299 800
type11	4 016 890	412 812	1 887 557
total	**10 412 961**	**766 190**	**10 091 545**

[4] List of ECO types

1	Building fabric
2	Doors and windows
3	Electric space heating
4	catering
5	lighting
6	Domestic hot water
7	Control systems
8	Electronic office equipment
9	Space heating
10	Ventilation
11	Other

Comments

- Very little recommendations in the field of electricity demand side management
- Typology needs to be refined because 40% of recommendations fall in the "other" category (type 11).
- Usual results on bullding envelope (type 1 and 2), roughly 40%, and space heating systems (15%)

Breakdown of ECOs by pay back

Pay back time is estimated according to recorded information: cost and savings in Euros. No cost savings are incorporated. Investment that generate no savings (or information not recorded) are considered a 100 year pay back time..

Pay Back Time	Cost Euros	Savings Euros/year	Energy savings kWh/year
=< 4 years	203 916	153 890	2 018 405
5 - 8 years	404 137	73 401	1 362 578
8 - 16 years	3 856 848	430 978	3 353 739
+ 16 years	5 948 059	107 921	3 356 823
total	10 412 961	766 190	10 091 545

Breakdown of ECOs according to declared implementation delay

delay	Cost Euros	Savings Euros/year	Energy savings kWh/year
< 12 months	5 402 627	342 933	5 862 352
12 to 24 months	1 089 318	70 220	2 478 206
+ 24 months	3 921 016	353 036	1 750 987
total	10 412 961	766 190	10 091 545

Evaluation of Savings generated by the DMSS in the building sector

It is currently admitted that the ECOs that will be implemented are including those with a Pay back time of less than 8 years and those declared to be implemented within 12 months.
For the considered sample, they represent savings of 3 380 000 kWh to 5 860 000 kWh/year (mostly on fossil fuels as DSM on electricity is less than 2% of the total) that is 291 to 505 TOE for 180 buildings. By extrapolating to the 4100 buildings surveyed in 2001, the DMSS should have generated between 6600 and 11500 TOE/year .

[i] Conseil d'administration - séance du 25 Février 1999 : Délibération n°5 sur les aides à la décision.
[ii] Dossier Conférence de presse du 18/05/1999
[iii] Contrat de Plan Etat Ademe 2000-2006 . Publication N°4044 - June 2001